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COMPUTERWORLD

HAPPY BIRTHDAY, X86

The chip family that set the bar for microprocessors is still humming after 30 years.
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Don't Miss . . .

Northrop Grumman's high-performance 'SuperCluster' computer is 20 times faster than before. PAGE 30

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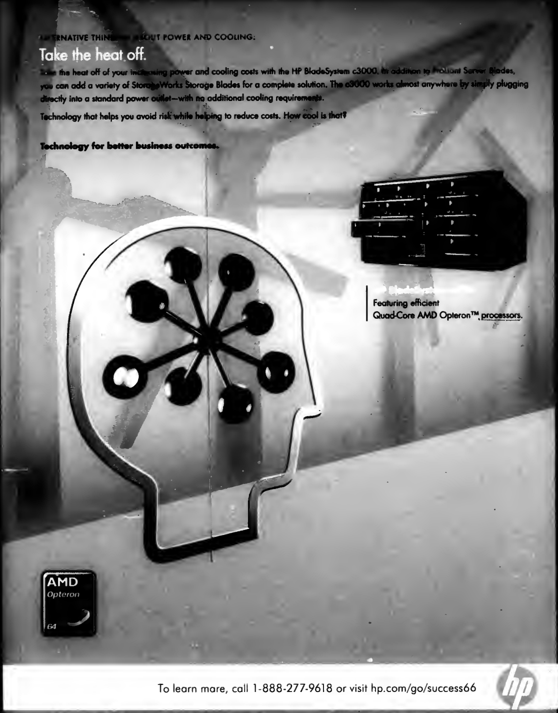

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6 Barack Obama's presidential campaign seeks a network security expert to help **lock down** its Web site. | **Amazon.com** remains mum on the cause of recent **downtime and performance problems**.

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■ EDITOR'S NOTE

Don Tennant

Thinking 101

I RECEIVED AN E-MAIL from a reader last week in response to my "Best and Brightest" column that made a deep impression on me. In the column, I expressed my conviction that the community of IT leaders is one of the most influential resources we have to counter the shallowness of thought that permeates so much of what we encounter in our lives every day.

The main text of the e-mail was simply a quote: "If you teach a man to think he is thinking, he will love you. If you teach a man to think, he will hate you." The reader added nothing more, except to say that he was still trying to identify the quote's author.

The reader couldn't have known how impeccable his timing was. At almost exactly the same time he sent that e-mail, another reader was posting a comment on my blog in response to an item I'd written about him last Nov. 11. (It's unclear to me why it took him seven months to do so.) My Nov. 11 post, titled "The perplexity of online incivility and ignorance," carried the full text of an e-mail I'd received from this reader in response to my Nov. 5 column, "Using Women." (That column, you may recall, took issue with a U.K. company's use of scantily clad women in its booth at a Gartner conference.) Here's the reader's e-mail from my Nov. 11 post in its entirety:

Nice try Don, but women are not going to flock to your "manly but sensitive" door ready to give themselves to you. The jig is up on the "sex and drugs and rock-n-roll" generation's attempt at telling everyone they cannot do what we did. The politically correct manure wagon ran off the trail and over the cliff. People are no longer willing to let the news media tell them what is acceptable and what is not. If naked women offend you, then you and your boyfriend should leave. We don't really care what offends who. The world can't, because a cure for cancer would offend someone. If I have offended anyone, place your thumbs (assuming you have thumbs) in the appropriate areas, woit a minute, then switch! Grow up, sex sells. Always has and always will. It seems real men enjoy the semi-nude female figure, and it took a company from the U.K. to put it back and say it is okay to be a normal man. America, you are such a mess. So are you, Don.

> **" If you teach a man to think he is thinking, he will love you. If you teach a man to think, he will hate you.**
>
> **AUTHOR UNKNOWN**

The reader did have the courage to identify himself, and while I praised him for that in my blog post, I expressed surprise at the mean-spiritedness of the response, calling it "almost a caricature of narrow-mindedness and insensitivity."

The reply that the reader posted last week claimed that it was obvious he wasn't serious and that I was just out to incite trouble at his expense. The full text is in my blog, but here's the thrust:

There are MAJOR clues within the e-mail, Don, that suggest the reply was meant to be in jest, that the author agreed that women should be treated with respect, that only cave dwellers would think otherwise. So let me thank you for spitting on my name in a public forum.... Had anyone harmed me or my family due to your public agitation regarding something you obviously are not intelligent enough to understand (or maybe you did and just wanted to play the part of the intellect you think you are), I'm not quite sure what actions I may have taken, Don. However, I can assure you there would have been ramifications in some form. Think about that before you trash someone else whose writings pass over your head, and whom you put in a danger that they are not even aware of, Don. You got lucky this time. Also, be very thankful I am not the person who you thought I was. That type of person may have visited you, in person.

The reply I posted in my blog was that I'm happy to leave it to our readers to decide if I was off base, and whether his denial was plausible. In any case, I'm not going to stop trying to get people to think. ■

Don Tennant *is editorial director of* Computerworld *and* InfoWorld. *Contact him at don_tennant@computerworld.com, and visit his blog at* http://blogs.computerworld.com/tennant.

■ ONLINE CHATTER

RESPONSE TO:

A Trickle Into The Enterprise

June 2, 2008

This quote appears in the article: *"I have nothing against iPhone. It's great," says Manjit Singh, CIO at Chiquita Brands International Inc. "But we're a BlackBerry shop, and I don't think iPhone brings anything new to the table. It has a great user experience, but that's all."*

And here, folks, is the perfect illustration of what's wrong with many corporate IT departments. It just has a great user experience — what good is that, right?

■ **Submitted by:** *Jim*

RESPONSES TO:

Full Appeals Court Hearing Sought in Border Laptop Search Case

June 3, 2008

I don't have an issue with customs agents "checking" the content at the time a person is crossing the border. I do have a problem with copying the entire contents or confiscating media if they do not see anything at the time of the border check. The government has no right to confiscate a person's or company's IP without due process, or at least some shred of evidence that further investigation is warranted.

■ **Submitted by:** *Anonymous*

They're not going to uncover any terrorist plots by searching data on laptops passing through customs. Data passes over our borders at astonishing rates every hour of every day, and no border patrol agent is pulling that data to the side and duplicating it or running AccessData's FTK tools against it.

At best, it's the U.S. policing international sex crimes, which is arguably all well and good. But since this sort of activity is policed in other ways, I can't agree with this level of invasion. At worst, though, this is Big Brother enforcing his backward and often hypocritical moral agenda — and spending my tax dollars to do it.

■ **Submitted by:** *Anonymous*

JOIN THE CHATTER! *You, too, can comment directly on our stories, at* **computerworld.com**.

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Narcissists at Work: How to Handle These Bullies

Charismatic but cruel, narcissists can be highly disruptive to any workplace. Author Jean Ritala offers tips on how to deal with them before they wreak too much havoc.

The '$100 Laptop' May Be a Glimpse Of the Future

Mike Elgan thinks the laptop of the future – say, five years from now – might look a lot like the XO 2.0 clamshell, a prototype of the next version of the One Laptop Per Child device.

You Must Make Room for Vendor Management Offices

Forrester analyst John McCarthy explains how to cost-justify this function, which is growing more critical as the economy contracts.

The Future of E-paper: The Kindle Is Only the Beginning

EPD technology – in other words, e-paper – has been a long time coming, but it's finally just around the corner. What can we expect in tomorrow's versions of Amazon's Kindle?

Top 5 Mistakes of Privacy Awareness Programs

Jay Cline says companies that limit their privacy awareness programs to a PowerPoint presentation and a few trinkets are missing a big opportunity to reduce their risk.

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News Digest

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THE WEEK AHEAD

MONDAY: *Computerworld*'s Infrastructure Management World conference opens in Washington.

TUESDAY: The HP Technology Forum & Expo begins in Las Vegas. Also, Mozilla plans to release its Firefox 3.0 browser.

WEDNESDAY: Red Hat's annual user conference starts in Boston. And the International Supercomputer Conference opens in Dresden, Germany; a new version of the Top500 list of the world's fastest supercomputers will be released.

WEB 2.0

IT Execs Cite Ways to Lure Users to Web 2.0

BOSTON

CONVENTIONAL wisdom says that the Generation Y workforce is demanding Enterprise 2.0 tools such as wikis and social networks while stodgy, baby boomer executives are stifling those requests.

In fact, said a panel of Web 2.0 veteran executives at the Enterprise 2.0 Conference here last week, the biggest challenge is convincing end users of all ages to use the new technology.

Wachovia Corp. turned to organizational psychologists, communications personnel and others to identify potential problems before launching its Web 2.0 project two years ago.

Nevertheless, the Charlotte, N.C.-based financial services firm "still underestimated the change impact," said Pete Fields, director of e-business. "Change management is the biggest threat" to a successful corporate implementation, he added.

Wachovia did overcome the obstacles and has now rolled out wikis, blogs and employee social profiles to half its workforce. Fields said that all 120,000 Wachovia employees should have access to the Web 2.0 tools by the end of this year.

Don Burke, doyen of Intellipedia, the CIA's Wikipedia-like project, said that middle managers at first resisted the spy agency's effort to offer the Web 2.0 tools to employees.

"Middle management is about making the trains run on time," Burke noted. "Their job is to do today's job. The incentives in our hierarchy are not designed to leverage these kind of fundamental changes."

The agency responded by moving slowly, which helped it gain support over the past two-plus years. The collaboration system now includes a YouTube-like video channel and a Flickr-like photo-sharing feature.

Pfizer Inc. gained support from leery users by selecting a group of early adopters, or "Enterprise 2.0 consultants," to convince skeptics in its various lines of business, said Simon Revell, manager of Enterprise 2.0 development.

"The trick for us was to provide them the support needed to get this off the ground," he said.

Now, as the drug company adds a social network to its two-year-old Web 2.0 portfolio, "the biggest challenge for me is expectations management," says Revell. "I sense there is a frustration that [the project] is not moving more quickly."

— Heather Havenstein

DATA CENTERS

IBM Expands Its Modular IT Line

IBM is trying to do for data centers what McDonald's helped do for burgers and fries: create an efficient, quasi-manufacturing process for building them.

IBM last week said it is expanding a standardized design approach aimed at speeding up construction of data centers and reducing their operational costs.

The company launched its Project Big Green energy-efficiency program last year for modular data centers with up to 2,500 square feet of floor space. Now it's offering enterprise-class facilities from 5,000 to 20,000 square feet. IBM also said that it will preconfigure systems in shipping containers, like Sun Microsystems Inc. and other vendors already do.

Most data centers have a "hodgepodge" of equipment, said Forrester Research Inc. analyst Chris Mines. But, he added, as servers become more standardized, users may be receptive to the idea of modular data centers.

– PATRICK THIBODEAU

News Digest

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GETTY IMAGES

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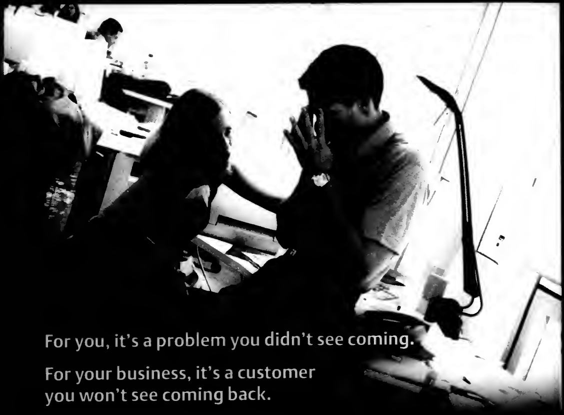
– PATRICK THIBODEAU



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SECURITY

Obama Campaign Seeks Web-Site Security Help

TWO MONTHS after its Web site was hacked by a Hillary Clinton supporter, Sen. Barack Obama's presidential campaign is looking for a network security expert to help lock down the site.

The job requirements posted on BarackObama.com are pretty much what you'd expect in any help-wanted ad for an online security position: VPN and Unix or Linux experience, plus a "deep understanding" of the LAMP stack of open-source software. And, of course, applicants must be willing to "respond off-hours to high-urgency security situations."

Some security researchers said that this is the first time they can remember seeing a Web security job advertised by a political campaign.

But even if security jobs aren't always advertised openly, online security is a top priority for political campaigns, said Henry Poole, a co-founder of CivicActions LLC. "Maybe it's just an issue of the Obama campaign being more transparent," Poole added.

And with much of the money he has raised coming via the Internet, security is arguably more important to Obama than it has been to any of the other presidential candidates.

Obama's site, built by Facebook Inc. co-founder Chris Hughes, has been a model for Web 2.0-style campaigning through its use of social networking techniques to help raise funds and build a broad base of active, Internet-savvy supporters.

But powerful Web site features can also open up new avenues for hackers. In the April incident, for example, a programming error allowed the perpetrator to redirect part of Obama's Web site to Clinton's. And a SQL injection attack that exposed sensitive data could have much more serious consequences.

"If I was able to get access to the database that houses their donor information, that would be very concerning," said Oliver Friedrichs, a director of emerging technologies at Symantec Corp.

A Web site privacy breach could quickly become a major campaign issue, Poole noted. "For a big office," he said, "things like the reputation of the candidate are really important."

— Robert McMillan, IDG News Service

Short Takes

Just hours after ending talks with would-be buyer
late last week.
said it has agreed to run advertising from
alongside its search results. The nonexclusive deal came as a setback to Microsoft, which had hoped that an acquisition of Yahoo would strengthen its own online business. Yahoo said it ended the Microsoft talks because the software maker was interested only in Yahoo's search business, not the entire company.

has issued a patch for a security vulnerability affecting several versions of its open-source office suite. The vulnerability could allow a hacker to execute commands on affected systems. The flaw affects Versions 2.0 through 2.4.

has settled patent-infringement claims brought against it by
and Terms were not disclosed. The plaintiffs had charged that Red Hat's Hibernate product violated their patents.

WEB SITE MANAGEMENT

Amazon's Site Goes Down, Gets Up, Stumbles Again

FOR UNEXPLAINED REASONS, Amazon.com Inc.'s Web site was inaccessible for about three hours on June 6 and then suffered from performance slowdowns last Monday.

During the initial outage, the online retailer posted a notice on its forum site for sellers saying that the snafu was an "unplanned event." Later, an Amazon spokesman said only that the company's systems are "very complex" and may run into problems "on rare occasions, despite our best efforts."

Then, for a 20-minute period on June 9, only about 30% of would-be visitors managed to get onto the site, according to Keynote Systems Inc., which tracks Web performance.

After the site briefly stabilized, its availability fell off again, with only 68% of shoppers able to access it for a period of 13 minutes, Keynote said.

Amazon again confirmed that there was a problem without disclosing what it was. It said that some customers had reported "intermittent" access problems on Monday and that it was "working to resolve the issues."

Shawn White, Keynote's director of external operations, speculated that a faulty system configuration may have discombobulated Amazon.com's vast network of servers. "The more complex a system is, the more challenging it is to maintain," he noted.

– LINDA ROSENCRANCE, WITH JUAN CARLOS PEREZ OF THE IDG NEWS SERVICE

SLOW GOING

Amazon's typical page-loading time

Average response time during the recent incidents

IBM

_INFRASTRUCTURE LOG

_DAY 89: Our power and cooling costs are out of control. We spend the bulk of our IT budget just keeping the data center cool. I told Gil we need to go green in a big way.

_DAY 91: Gil took us green...kelly green, to be exact.

_DAY 93: You don't go green with paint. You go green with IBM Cool Blue™ technology and energy management services. Advanced server and storage virtualization can help consolidate our boxes to lower energy usage. And the new IBM POWER6™ systems help us use less energy doing the same amount of work.¹

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SUPERCOMPUTING

IBM Smashes Petaflop Performance Record

IBM'S NEW Roadrunner supercomputer has smashed the high-tech equivalent of the four-minute mile by breaking the lofty petaflop barrier.

IBM said last week that the hybrid system running AMD Opteron processors and Cell chips sustained a speed of 1.026 quadrillion calculations per second, about twice as fast as the next-fastest supercomputer, IBM's BlueGene/L. Don Grice, chief engineer of the Roadrunner project, said the petaflop barrier was surpassed on May 25, on the fourth attempt.

The $100 million Roadrunner would take a single week to run a calculation that the fastest supercomputer 10 years ago would have needed 20 years to complete, officials said.

The supercomputer will be shipped in July to the U.S. Department of Energy's Los Alamos National Laboratory, which will use it to test nuclear weapons systems, predict long-term climate change and try to develop an HIV vaccine, among other things, said John Morrison, high-performance computing division leader.

"We're dealing with nuclear weapons," said Thomas D'Agostino, administrator of the National Nuclear Security Administration. "Speed is of critical importance here."

The Linux-based Roadrunner has 6,948 dual-core Opterons on IBM LS21 blades, as well as 12,960 Cell processors on IBM QS22 blades. The machine, which has 80TB of memory, has 296 IBM BladeCenter H racks. It occupies 6,000 square feet, uses 57 miles of fiber-optic cable and weighs 500,000 pounds.

The Cell chips were designed jointly by IBM, Toshiba Corp. and Sony Corp. for the latter's PlayStation 3 game console.

— Sharon Gaudin

Roadrunner is twice as fast as BlueGene/L, says Don Grice.

PHOTO COURTESY OF IBM

BETWEEN THE LINES *By John Klossner*

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...HOSTED ON OUR INTRANET...
...DOWNLOADED to the APPROPRIATE PERSONNEL...
... AND CERTIFIED BY US...
... INSTALLED VIA iTUNES...
...THEN YOU CAN GO to the BATHROOM
IT
Apple
iPhone
CORP. USER
Klossner

Lou D'Ambrosio resigned as president and CEO of for medical reasons. He was replaced on an interim basis by Charles Giancarlo, a venture capitalist and former Cisco executive.

said Blue Cross Blue Shield of Massachusetts Inc. will let its members import claims data into their Google Health profiles. It is the first insurer to support the new online service.

Microsoft Corp. announced that co-founder Bill Gates would give up his day-to-day role at the end of this month. But he will remain its chairman.

Global Dispatches

Limits Sought On U.K.'s Personal Data Gathering

LONDON – The U.K. Parliament's Home Affairs Committee has urged the government to stop creating large databases to hold personal information on citizens without first proving that the data is needed.

In a report released last week, the committee called on the government to "adopt a principle of data minimization," and hold data only "for as long as is necessary." The government should "resist a tendency to collect more personal information and establish larger databases," said the report, titled "A Surveillance Society?"

Home Affairs Committee Chairman Keith Vaz said the government should not keep collecting more data "just because the technology allows it," nor should it use the data beyond the purpose it is initially collected for.

Leo King,
Computerworld U.K.

Kenya Forming Group to Create IT Standards

NAIROBI, Kenya – The Kenya Bureau of Standards is calling on technology experts in the country to join in the effort to develop national IT standards.

The bureau plans to form a committee to collect and analyze information and then draft relevant standards, according to Zacheus Mwatha, a manager at the standards bureau.

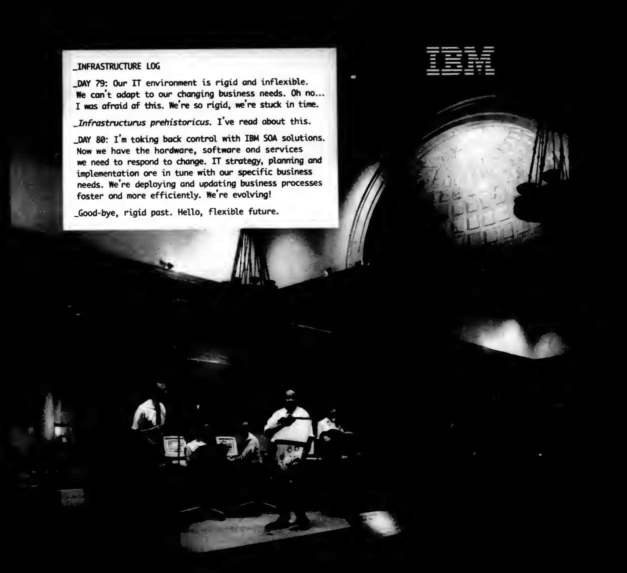
The standards would likely cover areas such as telecommunications, IT security and data formats. Mwatha said all committee members will be asked to attend international meetings and vote on international draft standards.

Rebecca Wanjiku,
IDG News Service

BRIEFLY NOTED

Hewlett-Packard Co. has named Neelam Dhawan managing director of its operations in Delhi, India. Dhawan will join HP next month from Microsoft Corp., where she is managing director for India. She will replace Balu Doraisamy, who was named managing director for HP's Asia-Pacific region and Japan in February.

Channelworld India staff

IBM

_INFRASTRUCTURE LOG

_DAY 79: Our IT environment is rigid and inflexible. We can't adapt to our changing business needs. Oh no... I was afraid of this. We're so rigid, we're stuck in time.

_*Infrastructurus prehistoricus*. I've read about this.

_DAY 80: I'm taking back control with IBM SOA solutions. Now we have the hardware, software and services we need to respond to change. IT strategy, planning and implementation are in tune with our specific business needs. We're deploying and updating business processes faster and more efficiently. We're evolving!

_Good-bye, rigid past. Hello, flexible future.

WebSphere

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BM COM/**TAKEBACKCONTROL**/SOA

IBM, the [illegible]
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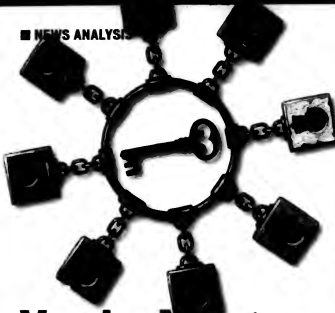

STEPHEN BARNWELL/THEISPOT

Vendor Missteps Keep Network Security a Work In Progress

Access control features are now expected to show up in mainstay data center software. By Jaikumar Vijayan

WHEN CISCO SYSTEMS INC. announced in June 2004 that it planned to develop network access control technology, it drew enormous attention to what had been an obscure market niche.

All of a sudden, users believed that NAC products could make corporate networks nearly impervious to compromises that took advantage of vulnerable devices like PCs and laptops. The backing of a top networking company would help usher in a new IT era in which security was tied much more closely to the network fabric.

Interest increased even further four months later, when Microsoft Corp. announced plans to incorporate NAC-like technology into future versions of its operating systems. Microsoft called its NAC offering Network Access Protection (NAP).

Alan Shimel, chief strategy officer at StillSecure Inc., a Superior, Colo.-based vendor of NAC products, said Cisco and Microsoft managed to create a buzz around NAC and legitimize it to an extent that wouldn't have been possible otherwise.

But the buzz didn't last long, once Cisco and Microsoft failed to deliver on their early promises.

Analysts today say that users should instead look for NAC capabilities to be incorporated into a variety of core data center products, from configuration management tools to antivirus software.

Cisco started bringing out some stand-alone NAC tools about a year after its announcement, but the job of integrating NAC functionality into its switches and networking gear is still mostly a work in progress.

Meanwhile, Microsoft's NAP technology is only now becoming a reality in Windows Server 2008.

"In those four years, they froze the market," Shimel said. "There was a sizable chunk of people who were interested in NAC but said they were not going to do anything because Microsoft's product was just over the horizon."

NAC's image among users has also suffered as a result of unsuccessful corporate IT efforts to broadly implement the technology.

For example, even before Cisco launched its initiative, Wells Dairy Inc. in Le Mars, Iowa, was burned when it tried to use NAC products to secure its network.

Wells installed an endpoint access-control product from a vendor that was later acquired by a larger company. The technology was designed to inspect the computers of workers at remote sites, and Wells at first had some success stopping improperly patched systems from logging onto its network, said Jim Kirby, a senior network architect at the company.

But Wells ran into problems when it tried to more closely integrate the product into its Cisco infrastructure to better control what users could do on the network. Nine times out of 10, said Kirby, the product would improperly lock users out of the Cisco network, so the company had to abandon the effort.

"It was difficult to manage, broke down all the time and was really complicated," Kirby said. "When the rubber met the road, it was a very new kind of technology."

Kirby asked that the product not be identified.

Early third-party NAC tools, which

Continued on page 12

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Continued from page 10

emerged around 2002, were designed to help companies enforce security policies at network endpoints. The technology let IT managers set rules to prevent client devices from accessing a network unless they complied with corporate policies on security patches, antivirus software updates, firewall configurations and other security settings.

Prior to the moves by Cisco and Microsoft, NAC tools came mostly from small vendors such as InfoExpress Inc., Sygate Technologies Inc., which was acquired by Symantec Corp. in 2005, and Zone Labs Inc., which was acquired by Check Point Software Technologies Ltd. in 2004.

The early stand-alone products were designed to address concerns about vulnerable endpoint devices on networks — especially those used by remote office workers and telecommuters.

Despite the setbacks to the technology's image and the uncertainty that arose in the wake of the moves by Cisco and Microsoft, third-party vendors continue to update their NAC tools by adding new functions such as identity-based access management. And the smaller vendors insist that after a temporary lull, demand is once again picking up.

Network Security Woes

In an analysis of 580 networked PCs worldwide, security firm Sophos PLC found the following:

- **63% were missing critical security patches for Microsoft applications.**
- **21% were missing Internet Explorer security patches.**
- **15% of the anti-malware software found on the machines was either disabled or not current.**
- **50% of the firewalls were disabled.**

NAC's backers tout some successful implementations.

For example, NaviMedix Inc., a Cambridge, Mass.-based provider of communications services to health care providers, has been successfully using a NAC product from Bradford Networks Inc. in Concord, N.H., for about 18 months. NaviMedix uses the tool to inspect laptops and computers belonging to temporary workers and contractors before giving them access to the corporate network.

The product checks each machine for the presence of viruses, Trojan horses or other malicious code and then logs the online visitor onto a secure area of the company's network.

> **NAC functionality is going to be a must-have. But where it resides and how it is implemented are really big questions.**
>
> **CAROL BAROUDI**, ANALYST, ABERDEEN GROUP INC.

NaviMedix also uses the product to monitor all of the company's PCs to make sure patches are installed and to enforce site access rights.

Craig Richard, the company's IT director, said the product has allowed NaviMedix to free up one worker from his previously full-time duties of inspecting visitors' systems.

American Bancard LLC uses NAC technology from StillSecure as part of an effort to comply with the Payment Card Industry data security standard mandated by the major credit card companies, said Steven Scop, the Boca Raton, Fla.-based payment card processor's chief technology officer.

The product helps American Bancard vet machines belonging to its "external workforce" of contractors and temporary help, he said.

In the future, companies will increasingly demand technology that can better control endpoint devices, said Carol Baroudi, an analyst at Aberdeen Group Inc. in Cambridge, Mass.

But they probably won't turn to today's specialized NAC devices. Instead, she said, products like unified threat management systems, configuration management tools and even antivirus tools that increasingly include NAC-like functions will be the choice of corporate users.

"NAC functionality is going to be a must-have," Baroudi said. "But where it resides and how it is implemented are really big questions." Eventually, "NAC as a category will go away. It's not that NAC is a bad idea. It's all about where it gets implemented," she added.

But the future remains something of a work in progress as users and third-party vendors find little consensus on what the next generation of NAC technologies will look like.

The uncertainty surrounding Cisco's strategy has left many users apprehensive about buying the current generation of NAC tools both from Cisco and third parties. Some companies are avoiding the Cisco products because of fears that they will require extensive — and costly — upgrades of the vendor's routing and switching equipment. Some users are also unsure whether third-party NAC products will work in a Cisco networking environment over the long term.

Today, Cisco officials acknowledge that some of the vendor's early NAC messages may have been misunderstood by users and third-party vendors. Brendan O'Connell, senior director of product management at Cisco, contends that the company never planned to integrate NAC policy management functions into the network layer.

The company's goal, he said, has always been only to integrate NAC command-and-control functions at the network layer while delivering policy configuration and management functions separately via stand-alone products.

However, in early 2005, Cisco bought Perfigo Inc. to gain the technology needed to deliver policy configuration and management functions, he acknowledged.

"One thing I don't think we were particularly clear about were the command-and-control aspect and the policy layers," O'Connell said. "Way on down the road," Cisco will deliver the policy layer on its switches, he added.

The question among some analysts and users is whether corporate IT managers will have turned to other options by then. ■

Continued from page 10

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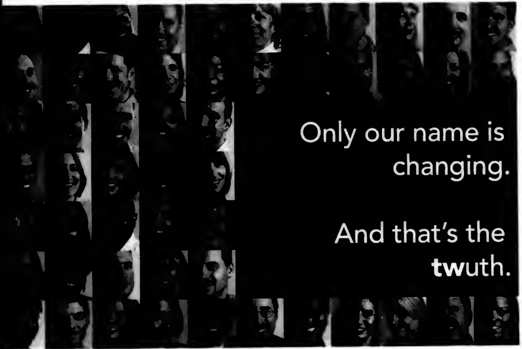
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« Apple CEO Steve Jobs at the company's developers conference. Below: the iPhone 3G.

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New iPhone Still Faces Corporate Disconnects

Apple is trying to reach out to enterprise users with its 3G phone and iPhone 2.0 software. But it doesn't have all the answers yet. **By Matt Hamblen**

APPLE INC.'s announcement last week of a new iPhone designed to be more enterprise-friendly provoked a mix of curiosity and concern among IT managers who are weighing whether their organizations should purchase the trendy handheld for business use.

The verdict: Apple still has both hardware and software issues to work through before the iPhone is likely to be widely adopted in corporate environments.

One of the big question marks is Apple's process for installing applications on iPhones, especially if a company has deployed hundreds or thousands of the devices.

Apple CEO Steve Jobs, who unveiled the iPhone 3G at the company's developers conference in San Francisco, detailed a distribution model for custom applications that is based on a decidedly consumer-oriented piece of software: iTunes.

Under that approach, companies need to obtain digital certificates for homegrown applications from Apple, then transmit the applications to Macs and PCs running iTunes. Individual iPhones have to be connected via a cable to an iTunes-equipped desktop computer in order to synchronize with the software and get access to the applications.

The direct-connect synchronization plan left IT managers such as Vivek Kundra, chief technology officer for the District of Columbia, looking for more options from Apple.

Kundra is beta-testing about 15 first-generation iPhones along with the iPhone 2.0 software that Apple announced earlier this year. The $199 price tag for the entry-level iPhone 3G will make the device "a lot more palatable for the enterprise," he said.

But Kundra is skeptical that relying on iTunes for distributing applications will work on a large scale. "Right now, using iTunes to download is fine with us," he said. "But when iPhone [use] scales to thousands of units, I want to push software to users wirelessly."

In an e-mail, Manjit Singh, CIO at Chiquita Brands International Inc., expressed concerns about the amount of control that Apple could exert over IT operations.

"I don't want to be carrier-locked [to AT&T], and I don't want to be forced to distribute apps via iTunes," Singh wrote. He added that needing permission from Apple to put an internally developed application on iTunes "won't be realistic" for Chiquita, which uses BlackBerry devices and has no plans to test the iPhone.

It remains unclear how third-party applications created with the iPhone 2.0 software developers kit will be distributed to corporate end users.

Other shortcomings that could dampen corporate enthusiasm for the iPhone include the need to mail in devices for battery replacements, the lack of an enterprise tech-support group at Apple, and the fact that the management and security tools available for the iPhone still lag behind those of the BlackBerry and other rivals.

Apple has taken some big steps forward. For example, it has added support for pushing e-mail and contact lists from Exchange servers to iPhones, and for using Cisco Systems Inc.'s IPsec-based VPN technology to securely connect the handhelds to corporate networks.

Gartner Inc. analyst Ken Dulaney said Apple deserves credit for such features. But for now, he added, giving iPhones access to a limited set of applications, such as e-mail, might be the wisest strategy for companies adopting the device. ■

Agam Shah *of the IDG News Service contributed to this story.*

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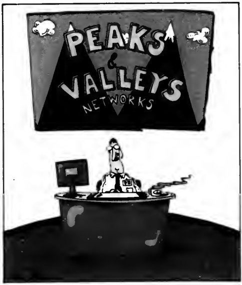

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GRC MANAGER

MATTHEW FAULKNER

Cutting Compliance Costs

GARTNER INC. recently reported that the costs of complying with Sarbanes-Oxley Section 404 dropped steadily from 2004 through 2006. That's due in large measure to simple experience. Companies are getting familiar with the regulations and how to work with (or around) them.

But Jacob Lamm has another explanation. The executive vice president of the governance group at CA argues that broad, integrated management software that looks at all aspects of governance, risk and compliance (GRC) has helped. Point tools that oversee a specific regulation or risk factor are costly, he says.

"Almost all areas of compliance risk cut across many departments," Lamm says, citing data privacy as an example that is pertinent to various business units in various ways. All the more reason, then, that they work from a common corporate policy, he says.

Experience plus tools make GRC easier and cheaper, says Lamm.

CA released GRC Manager 1.5 last week. The upgrade adds integration with other CA products, such as Records Manager and Message Manager, so that information within them can be monitored by GRC Manager to ensure compliance.

Version 1.5 includes a policy lifecycle management feature. With it, you can track a policy from the draft stage through distribution. The software also lets you see where the highest levels of risk are by regulation.

Pricing is implementation-specific.

The 10Gbit Solution

The pressures on data center managers continue to mount. Applications need to scale for millions of potential Internet users. Data center consolidation efforts are accelerating. Multicore servers are cranking out more data. And the information flowing across the wire is now often isochronous (voice and video) rather than asynchronous (data).

What you need is throughput, and Jeff Thermond, CEO of Woven Systems Inc. in Santa Clara, Calif., wants you to consider upgrading your data center network to 10Gbit/sec. systems. Specifically, he recommends Woven's EFX 1000 Ethernet Fabric Switch. The device uses a proprietary ASIC processor to switch traffic (using Ethernet 802.3 standards). The chip detects congestion in advance, cuts jitter and reduces latency enormously, Thermond says.

Woven's switches create a multigigabit network fabric for data centers.

You may think the 1Gbit/sec. Ethernet connections from your servers to your network fabric will work just fine in the years ahead. But Thermond predicts that in 2010, more than half of the servers shipped will sport 10Gbit/sec. links. What will you do then? Maybe give him a call. Prices start at $1,700 per port.

Changes for Change

When enterprise software is developed by teams in multiple locations and leverages multiple internal and external services, miscommunication about changes can have a ripple effect. John Carrillo, senior director at Telelogic AB, an IBM company in Malmö, Sweden, says various stakeholders should be able to see and respond to how each change will affect everything from a business process to a user interface. Hence the changes in Telelogic's Change.

No. 1
Rank of IBM in application infrastructure middleware development market, per Gartner.

Change 5.0, to be released next quarter, is a central repository allowing literally thousands of people to collaborate. The ability to scale it to meet all the needs of a large organization is one of the key changes in Change 5.0, Carrillo says. Among other improvements, the upgrade lets you export and import views to and from Microsoft Visio and Mindjet LLC's MindManager. Pricing begins at $20,000 (and change) for the Change 5.0 server. ■

MORE BUZZ
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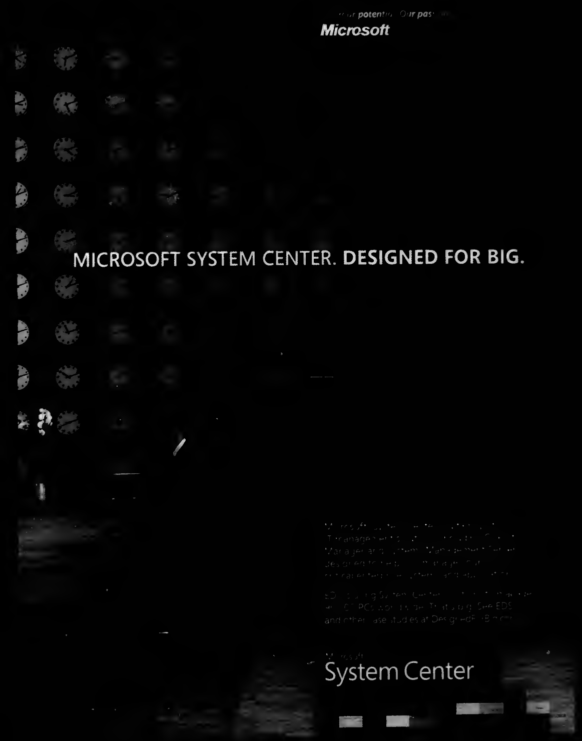
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THE GRILL

Patrick P. Gelsinger

Intel's **x86 pioneer** talks about **debating Bill Gates,** justifying the **extravagance of 32 bits** and **running the industry's top project** at age 25.

Patrick Gelsinger is an electrical engineer. He joined Intel Corp. in 1979, worked on the design of the 80286 and 80386 microprocessors, and was the chief architect for the 80486 chip. On the 30th anniversary of the x86 architecture's birth, he talked about why it has been so successful.

Intel and Microsoft in a sense grew up together. Did you have any interactions with Bill Gates early on? I had numerous interactions with him over the years. He was one of the smartest and most aggressive guys in the industry. He was always attacking, pushing, striving for more.

I remember at one point he had less-than-flattering things to say to me about the 80386. I was a junior engineer at the time, and he was already a legend in the industry. I started arguing with him. It was quite incredible. Everyone else in the room fell silent as Bill and I were going back and forth in a very aggressive manner. The senior Intel guy — after we had a little break to cool the air — told me I wouldn't be needed for the rest of the meeting.

So, how did the 80386 turn out? The 32-bit 386 was the turning point in the industry. The 80286 was a 16-bit architecture. At the time people said, "What do you mean, 32 bits? That's for minicomputers and mainframes." They derided us for being extravagant. I had many conversations with press people and analysts about what applications I could possibly conceive of that would need that much memory.

What are some other key events that you witnessed in the evolution of the x86 architecture? It was at that same time [in 1986] that the PC-compatible machine moved from IBM to Compaq. When PCs moved out from under the shadow of IBM, it really [created] an

Continued on page 20

Dossier

Name: Patrick P. Gelsinger

Title: Senior vice president and co-general manager, Digital Enterprise Group

Organization: Intel Corp.

Location: Portland, Ore.

Most interesting thing people don't know about him: He lives a very active Christian life and is the author of *Balancing Your Family, Faith & Work* (Life Journey, 2003).

First job: Technician and late-night radio DJ at WFMZ radio/TV in Allentown, Pa. He also worked at his uncle's dairy and race-horse farms as a kid. "I knew much more about cow chips than computer chips when I started at Intel."

Favorite vice: Starbuck's venti skinny latte.

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WHAT DO YOU HAVE TO SAY?

> **The 32-bit 386 was the turning point in the industry. . . . People said, 'What do you mean, 32 bits?'**

Continued from page 18

industry-standard platform.

Also, I'd point to the move to the Pentium Pro [in 1995]. It was a dramatic architectural leap to what's known as an out-of-order architecture [in which instructions could be executed out of order]. We just took the best ideas of computer architectures from the minis and mainframes and implemented them better, because we had a superior canvas to paint them on, called silicon.

The x86 faced a huge competitive threat from RISC computing in the late 1980s and early 1990s. What was your role in that? At the time, I was leading the development of the 486 at Intel while working on my master's degree at Stanford. My thesis adviser was John Hennessy [now president of Stanford University]. John and David Patterson were really known as the authors of RISC.

John and I had three public debates about RISC. I argued that even though the [CISC architecture of the x86] was a little bit slower, by the time you can develop new software for the RISC machine, we've made the [x86] machine that much faster. I said, "Already, John, your architecture is a failure because it can't deliver the software value that is already available in the x86." It was a particularly pointed comment in tbe debate, and he turned to me and said, "Who's your teacher, anyway?" And I knew he'd be giving me my master's diploma in just a few days.

Ultimately, you won the argument. Did Hennessy give you your degree? Yes. We had an overwhelming economic advantage because we had so much of an installed base and so many people developing. The RISC machine could never catch up. But John and I have a wonderful camaraderie to this day.

You worked on the design and development of the 386 but then became the chief architect for the 486 at the age of 25. What was that like? The 486 was my baby from beginning to end. It was frightening yet exhilarating at the same time. I had only a couple of years of experience, having just finished my degree at Stanford, and I was put in charge of what would be the most important project in the industry at the time. There were 100-plus people in the program, some of them 25 years my senior.

What is the "software spiral"? The day before we introduced the 80486 [on April 10, 1989], we already had billions of dollars worth of software waiting to run on the chip. When we introduced it, [Intel CEO] Andy Grove made this powerful statement about the "software spiral." The idea of the spiral was, we'd introduce hardware that was faster than the software and then allow the software to catch up, which requires the hardware to jump ahead again. So software begets hardware, hardware enables software, and that spiral is really what's been driving the industry for many, many years.

x86 PAST, PRESENT, FUTURE
For more on the evolution of the x86, see our cover story (**page 28**) and Future Watch (**page 32**).

It seems that that concept still holds, with multicore chips now available but without a lot of software that can run on more than one processor at a time. Exactly. I'd say we have made a new turn in the spiral, which is the move to multicore.

When did Intel realize that the game was up for processor clock-speed improvements and that the future lay in multicore processors? I was chief technology officer for Intel in 2001, and I published a paper that became known as "the power wall" paper. It had this graph, which became famous, that plotted the thermal density — how much power we were trying to squeeze into a given area of silicon — and it showed that our chips would have the thermal density equal to a nuclear reactor or to the surface of the sun [by 2015]. It showed that the trajectory we were on was not sustainable. We needed to make what became known inside Intel as the right-hand turn.

There were huge debates internally over the data — whether we could continue on the curve we were on, whether there were cooling systems that would allow us to continue and so on. And people said, "Hey, if we aren't in the gigahertz race, where are we? Our competition will build gigahertz chips, and the market has been conditioned to see that as a better chip." So there were technical reasons and market reasons why there was tremendous resistance to the argument.

What does the future hold for the x86? I gave a speech at the Intel Developer Forum in Shanghai [in April]. I included a picture of the [mythical] Monkey King, which in China had a very powerful tool — the golden stick. It could be as small as a needle or as big as a pillar that held up the sky. In my speech, "From Milli Watts to Peta FLOPS," I made the analogy that, like the Monkey King that had the golden stick, we had the architecture that will grow up to be the biggest things on Earth — petaflops computers — and also the smallest computers on Earth.

— Interview by **Gary Anthes**

Congratulations Honorees!

COMPUTERWORLD
MOBILE & WIRELESS WORLD
Best Practices
IN MOBILE & WIRELESS
AWARDS PROGRAM

The "Best Practices in Mobile & Wireless" award honorees were announced Tuesday, June 10th during a ceremony at the 6th annual Mobile & Wireless World conference in Miami, Florida.

This program honors IT user "best practice" case studies selected from a field of qualified finalists.

Honorees in each of the following categories are:

Business Evolution through Mobilizing Field Workers

Honoree: **Northrop Grumman Corporation, McLean, Virginia**

Finalists:
- BP, Warrenville, Illinois
- Puckett EMS, Austell, Georgia
- Visiting Nurse Service of New York, New York, New York
- Wound Technology Network, Inc., Hollywood, Florida

Deploying Wireless Mobility in the Enterprise

Honoree: **PODS Enterprises, Inc., Clearwater, Florida**

Finalists:
- Detroit Medical Center, Detroit, Michigan
- Dolphin Stadium, Miami Gardens, Florida
- Land Rover, West Midlands, Great Britain
- Roto-Rooter, Cincinnati, Ohio

Innovation and Promise

Honoree: **RTI International, Research Triangle Park, North Carolina**

Finalists:
- City of Anaheim, CA, Anaheim, California
- Infrastructure Management Institute at Northern Kentucky University, Highland Heights, Kentucky
- Northrop Grumman Corporation, McLean, Virginia
- Oklahoma City IT Services Dept., Oklahoma City, Oklahoma

We'd like to thank our "Best Practices in Mobile & Wireless" Judges for 2008:

- Timothy Cox, OnStar
- Mark Dulle, Dorfman Pacific
- David Dully, Baptist Health
- Thomas Gagne, Continental Airlines, Inc.
- Sheng Guo, New York State Unified Court System
- Matthew Hamblen, Computerworld
- Randall Headrick, Air National Guard
- Julia King, Computerworld
- George Pollack, Wound Technology Network, Inc.
- Bill Trussell, TheInfoPro
- John Wade, Saint Luke's Health System
- Patrick Wise, Landstar

■ OPINION

Michael Gartenberg

Laptop Chic: Thin And Light for Spring

LIKE IT OR NOT, users are focusing more on the way their technology looks, not just how it performs. Vendors have seized on this, especially with laptops, where more than ever, design is a purchase criterion. This spring, it seems thin, small and light are in vogue.

Most of these stylish laptops are aimed directly at end users, but IT still needs to pay attention. Users are becoming more vocal about wanting to use something that looks good when they're working in the airport. And weight is certainly a factor that IT should be considering when outfitting the company's road warriors. If you keep providing barely luggable laptops, users will start to seek out alternatives on their own.

I've been looking at some of the hottest designs on the market from Hewlett-Packard, Lenovo and Apple. All weighed in at 3 pounds or so, but beyond that, each has a different set of strengths and weaknesses.

With an 8.9-in. screen and a keyboard that's 92% of full size, HP's Mini-Note 2133 is the smallest of the bunch (though noticeably thicker than the others). At $749, it's also the cheapest. But HP hasn't skimped: Besides 2GB of RAM and a 120GB hard drive, the Mini-Note has a full set of ports and an excellent glossy screen. The VIA processor is a little pokey for running Vista but handles Windows XP nicely (both are options from HP). The laptop was designed for the education market as a competitor to the Asus Eee PC, but the Mini-Note could be a road warrior's ideal second computer. The combination of price and feature set means some of your end users might start taking it on the road, with or without your blessing.

Lenovo's IdeaPad U110 is a consumer machine, differentiated from the more corporate ThinkPad brand. My test unit ran a 1.6-GHz Intel Core 2 Duo with a 120GB hard drive. The U110 has a nice selection of integrated ports and an 11.1-in. display that makes it a bit more suitable for extended use than the HP. It also ships with an external USB DVD drive and two batteries, with four and seven cells.

■ Users are getting more vocal about what they want.

But it's not the specs that will sell this machine; this is one of the most stylish and beautiful laptops I have ever used that didn't come with an Apple logo. Although this computer starts at $1,899, a lot of your company's employees will buy it, whether you support it or not. And you *will* be getting calls from users who didn't realize that Lenovo offers no XP drivers at all; at the moment, this machine is Vista-only.

As for Apple, it famously got in on the thin-is-in trend in January with the MacBook Air, marketed as the thinnest computer in the world. Set in an elegant aluminum enclosure, the machine (from $1,799) has a Core 2 Duo running at 1.6 or 1.8 GHz; an 80GB, 1.8-in. hard drive (or a 64GB solid-state disk, which adds $1,000 to the price); 2GB of RAM; and 802.11n and Bluetooth 2.0. One thing that's missing is an optical drive, although Apple sells a USB-powered DVD drive for $99. And one thing that takes some getting used to: The Air's battery is sealed, much like those in the iPhone and iPod.

A lot of IT departments that might balk at deploying anything as stylish as the MacBook Air or the IdeaPad U110 might find a compromise in the Lenovo ThinkPad X300. It looks like a ThinkPad, though it's less than an inch thick and has a 13-in. screen. But it's fully outfitted, with three USB ports, Ethernet, VGA, an optical disk (or extra battery) and wireless WAN, as well as GPS. For a road warrior, those are important considerations. Unfortunately, the only option is a 64GB solid-state drive, which is a bit skimpy for a high-end laptop and adds a lot to the cost, which starts at $2,476.

That's some of what's out there now. Expect to see them in users' hands soon. ■

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Innovation in Applications

AWARD-WINNING SOFTWARE PRODUCTS BASED ON INNOVATIONS BY INTERSYSTEMS

BY STAN GIBSON

INTERSYSTEMS CORP., THE CAMBRIDGE, MASS.-BASED MAKER OF INNOVATIVE database and integration platforms that support rapid application development, recently engaged analysts from International Data Corp. and *Computerworld* as judges for their worldwide 2008 Innovator Awards. The three award-winning applications are described below. Giving developers the ability to embed advanced technologies such as a high-performance object database and a rapid integration platform has enabled InterSystems' customers to build truly innovative world-class applications.

All three winners of InterSystems' contest were able to develop and deploy systems rapidly, while integrating data from a variety of sources in a unified system. The award winners were also able to use small development teams to create highly scalable and reliable solutions.

The InterSystems Innovator Award winners are not alone in their need for rapid development, a high-performance database engine, and integration capabilities. Enterprises of all kinds have sworn off big, ill-

The 2008 InterSystems Innovator Awards

Hans Rietveld, CSC Computer Sciences

Using InterSystems Ensemble® rapid integration platform and InterSystems Caché® high performance database, CSC Computer Sciences was able to connect and integrate existing applications using service-oriented architecture (SOA) and quickly deliver an easy-to-access, fast-responding system.

defined development projects, as well as isolated stovepipe applications, according to Carl Olofson, an analyst at International Data Corp. (IDC) in Framingham, Mass.

"Enterprises in all industries are seeking to develop applications rapidly, of course. But they also must connect their applications to common sources of data," Olofson says. "Software technologies such as the ones offered by InterSystems that can help enterprises achieve those development and performance goals are highly sought after by enterprise IT professionals," he says.

First-place Winner: CSC COMPUTER SCIENCES
(The Netherlands)

Faced with costs for healthcare that are spiraling relentlessly upwards, and desperately in need of a comprehensive new system to connect patients and general practitioners, the Netherlands National IT Institute for Healthcare (NICTIZ) needed to rapidly deploy an Electronic Health Record. The last thing they needed was a costly, open-ended application development project.

"Our client wanted us to be lean and mean. So we set out to design a small-budget solution that could be expanded as rapidly as needed," says Bob Schat, principal solution architect at CSC Computer Sciences BV in The Netherlands, which was tasked by NICTIZ to come up with a solution. The result was the National Healthcare Information Hub. (The Dutch name is Landlijk SchakelPunt, or LSP.) Using InterSystems Ensemble® rapid integration platform and InterSystems Caché® high performance database, CSC Computer Sciences was able to connect and integrate existing applications using service-oriented architecture (SOA) and quickly deliver an easy-to-access, fast-responding system.

The ability to connect with different systems and bring in data from them was particularly valuable to CSC Computer Sciences in developing the Netherlands National Healthcare Information Hub (LSP). One approach would have been to create a large central database, as was attempted by the healthcare community in the U.K. Instead, CSC Computer Sciences interconnected lots of local databases and systems using an index, which proved to be a simpler and less expensive solution.

"This lets everyone use the same applications as before. Implementing the hub was lots of work, but less than with a new application and a central database," says CSC Computer Sciences' Schat. The system pulls together data from all over Holland in two principal server locations and backs it up on a server that is hosted by CSC Computer Sciences. "They don't have to worry about backup at the local hospital," Schat says.

A key innovation of the LSP is to layer SOA on top of an existing application. The various players in the Dutch medical community implement the Web services interface to allow their application to communicate with the hub via standard Health Level 7 (HL7) messages. When that is done, the data on their servers can be indexed on one of the central servers.

The scalability made possible with InterSystems Ensemble will allow different members of the Netherlands healthcare community, such as general practitioners and pharmacies, to join when they are ready.

Ken Wolfe, ForeRun

ED Dashboard was enhanced specifically to meet the needs of physicians in tracking patients. The main application is built with InterSystems Caché, while InterSystems Ensemble provides connection and integration to numerous hospitals through standard HL7 messages.

Currently 50 participants are using the system, and another 10 are testing it. Schat says he expects 1,500 organizations to be using the healthcare hub by the end of 2008.

The need for a money-saving strategy was driven by the healthcare situation in The Netherlands. "As the population gets older, there are more old people who are not very healthy. At the same time, there are fewer people entering the healthcare profession. So we have to be more efficient and less expensive – to do more with less," Schat explains.

That's not all. New laws also mandate greater patient access to personal healthcare information. "One of the goals of the LSP is to get the patient in the driver's seat. Previously, patients could not access the system," says Schat. "They have the right to view information and correct wrong information. These issues were not well-solved in the local systems," says Schat. CSC Computer Sciences built a patient information portal using InterSystems Zen™ technology for developing rich Internet applications.

CSC considered other technologies but found none as mature and stable as Caché and Ensemble. The fast response times of Caché and the ability of Caché to work well on a small platform also helped sway the decision to go with InterSystems technology, according to Schat.

Second-place Winner: FORERUN INC.

(Waltham, Mass.)

A large, flat-panel screen containing critical patient information plays a central role in Forerun Inc's., award-winning product called ED Dashboard. The 40-inch screen, which can be read from a distance of 20 feet, replaces the whiteboard commonly found in hospital emergency rooms as a ready reference for patient status. More importantly, however, the ED Dashboard application pulls together all the relevant information for each emergency room patient so that nurses and attendants can view the information all at once.

"It's like air traffic control. The whole idea of the dashboard is that it can consolidate all information about the patient – radiology, lab results and so on – in one view that's color-coded according to priority. Because it's browser-based, you're only a few clicks away from the information," says Anthony Pilozzi, vice president of operations at Waltham, Mass.-based Forerun.

In emergency rooms, patients with urgent needs are constantly moving in and out. As a result, documentation frequently falls by the wayside. ED Dashboard is based on a system originally in use at Beth Israel Deaconess Medical Center in Boston. The system was enhanced specifically to meet the needs of physicians in tracking patients, according to Pilozzi. Other emergency room systems, he notes, are built around the billing and registration processes and often cause frustration among doctors. The main application is built with InterSystems Caché, while InterSystems Ensemble provides connection and integration to numerous hospitals through standard HL7 messages.

Third-place Winner: FORHEALTH TECHNOLOGIES

(Daytona Beach, Fla.)

Time was of the essence at ForHealth Technologies Inc., in Daytona Beach, Fla.

Matt Valentine, ForHealth Technologies

We were able to build a large-scale system that consisted of a number of different pieces quickly and easily.

"Our development team was given a very tight deadline to come up with a demonstrable version of our new product, IntelliFlowRx. We had compared Microsoft SQL Server and InterSystems Caché for the database platform of a previous product, and Caché came out way ahead in performance," says Matt Valentine, director of software development at ForHealth Technologies. "Building this system with a traditional relational database like SQL Server would simply not have been possible in the time frame for this project," Valentine adds.

IntelliFlowRx is a workflow application that complements a hospital's pharmacy information system to manage the production of IV doses, track dose delivery and capture the history of dose preparation. IntelliFlowRx streamlines the IV dosage process and prevents errors in dispensing medication by tracking dosages by barcode and storing JPEG images of dosage labels, which eliminates stacks of paper labels when labeling doses manually.

IntelliFlowRx is built around a service-oriented architecture (SOA) using the Web services capabilities of InterSystems Caché and InterSystems Ensemble.

"Caché has a lot of neat stuff – it takes care of the plumbing for you," Valentine says. Making a process available as a simple object access protocol (SOAP) Web service cuts through layers of programming that would be necessary with a typical relational database management system. "You build one object with three properties and you can get to it a dozen different ways without doing any extra work," Valentine explains.

The project to develop IntelliFlowRx was launched in late August 2007, and a demo version was ready early that November. In February 2008, the first version was deployed at selected sites. The work was done with a team of four full-time ForHealth staff, working in conjunction with six part-time developers from Bay Systems, InterSystems' implementation partner.

If streamlining the critical IV dosage process weren't enough, IntelliFlowRx also acts as a gateway to different pharmacy automation systems. This function is enabled with Ensemble.

"Ensemble adds the adapters, the widgets that allow us to talk to other systems," Valentine says.

Another important feature of IntelliFlowRx is its ability to project the status of IV doses on a large flat-panel video screen for hospital workers to easily track what is happening.

In the end, the ability to develop rapidly with InterSystems technologies paid off.

"We were able to build a large-scale system that consisted of a number of different pieces quickly and easily," says Valentine. "Other than me, no one else had used Caché before," he adds. "Yet, we were still able to do it in a tight time frame. Despite the learning curve, it was very fast to develop."

See product demonstrations of Ensemble and Caché and learn more about the Innovator Award winners at InterSystems.com/computerworld

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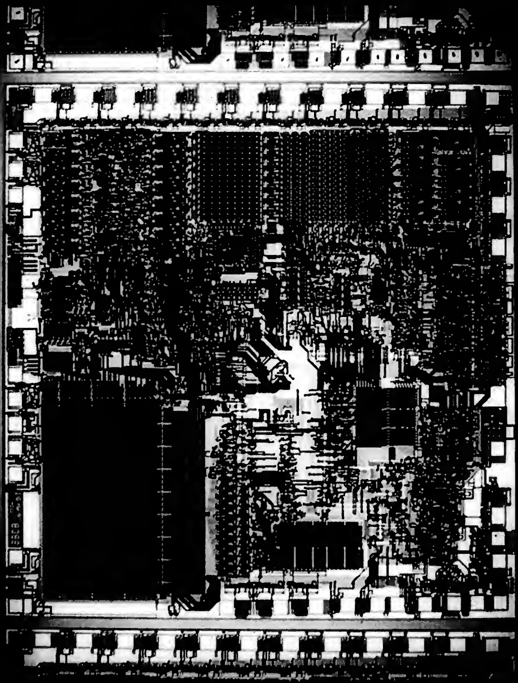

HAPPY BIRTHDAY, x86

IN JUNE 1978, Intel Corp. introduced a microprocessor known as the 8086. Over the decades that followed, the 8086's underlying architecture, later referred to as x86, would become one of technology's most impressive success stories.

The x86 family has progressed from desktop PCs to servers, portable computers and supercomputers. Along the way, it has vanquished or held at bay a host of competing architectures and chip makers. Even some markets that had seemed safely in the hands of other processors, such as Motorola's PowerPC, which is used in Apple's Macintosh computer, have yielded to x86 in recent years.

The term *x86* refers to the set of machine language instructions that certain microprocessors from Intel and a few other companies can execute. It defines the vocabulary and usage rules for the chip. X86 processors — beginning with the 8086 and including the 80186, 80286, 80386, 80486 and various Pentium models right down to today's multicore chips and processors for mobile applications — have incorporated a growing x86 instruction set, but each has offered backward compatibility.

THE SOFTWARE SPIRAL

At the time the 80486 processor debuted, Intel CEO Andy Grove developed a kind of corollary to Moore's Law called the "software spiral."

"The idea of the spiral was we'd introduce hardware that was faster than the existing software and then allow the software to catch up, which requires the hardware to jump ahead again," explains Patrick Gelsinger, lead architect for the 486. "That spiral is really what's been driving the industry for many, many years."

The spiral effect is very much in evidence today: Multicore chips are available, but there's little software that can really take advantage of them by running on multiple processors. It's why Intel is spending millions of dollars internally and at universities to develop tools and techniques for parallel programming.

– GARY ANTHES

THE FAMILY TREE

Intel's first processor was the four-bit 4004, which was made for a Japanese calculator in 1971. The eight-bit 8008 quickly followed and, in 1975, the eight-bit 8080 chip debuted. The 8080 went into the Altair 8800 PC, which was sold as a mail-order kit. That was a significant step, because Bill Gates and Paul Allen founded Microsoft Corp. to sell their version of BASIC for the Altair 8800.

Three years later, the 16-bit 8086 made its debut. IBM's selection of the 8088, an 8086 variant, to power its PC in the early '80s gave the x86 architecture tremendous momentum and helped it become an industry standard that persists today.

Patrick Gelsinger, electrical engineer, chip designer and now an executive vice president at Intel, says the introduction of the 32-bit 80386 in 1985 sent the PC industry into overdrive, though it was not obvious at the time that the x86 needed to be upgraded. "People said, 'What do you mean 32 bits? That's for minicomputers and mainframes,' " he recalls. "They derided us at the time for being extravagant." (See The Grill, page 18.)

At about the same time, the PC made a major break from IBM's control with the announcement of the 80386-based PC from Compaq Computer Corp. "We moved from a vertical industry to a horizontal industry, and that really opened up the world," says Gelsinger, who was a member of the 386 design team.

The IBM PC at the time ran the 16-bit 80286, which was more than three times slower than the 386. According to Intel, IBM spurned the 386 because there was no 32-bit software to take advantage of it. IBM, moreover, was developing a proprietary 16-bit operating system called OS/2.

RECIPE FOR SUCCESS

Why has the x86 been so successful for so long? For starters, it came along at just the right time. By 1978, computing had been migrating from huge, expensive mainframes to smaller, cheaper minicomputers for several years. The desktop was the logical next frontier.

Moreover, the x86 had an amazing property that had been anticipated in 1965 by a man who would one day become Intel's chairman and CEO. Gordon Moore predicted, in essence, that microprocessors would double in performance every two years at no increase in cost. His prediction proved correct, and the x86 went on to dominate computing from the data center to users' desks and homes.

[illegible]

Intel introduced its 8080 microprocessor in 1974, and the company's then-president and CEO, Gordon Moore, immediately began to worry about what would come next. He wanted it to be an architecture that would carry the company forward for decades. Some at Intel favored extending the 8080 architecture to 16 bits, while others, including ultimately Moore, favored developing a brand-new and much more advanced architecture.

So while engineers in Santa Clara, Calif., plugged along with the x86, Moore hired some bright engineers and started a lab in Portland, Ore., to design a processor that would become known as the iAPX 432 "micro-mainframe." But the design was [illegible] features in fault tolerance and multicore chips, for example, that wouldn't be standard for 25 years — that the processor became too big and complex.

[illegible] processor in 1981, the 432 was expensive and slow, and it didn't sell.

But what if the 432 had succeeded back in the late 1970s? "The x86 wouldn't have been invented," says David Patterson, a computer science professor at UC Berkeley. "Had the group that built the 432 built something less ambitious but ready to go, that's what we would be celebrating today. In some parallel universe, that's what Intel would be shipping today."

– GARY ANTHES

For Gates, Intel was just in time. He and Allen had tried but failed to develop their BASIC programming language for the wimpy 8008 processor in 1972. But they made it work on the more powerful 8080 that they soldered into an Altair microcomputer in 1975. That marked the beginning of a partnership between Intel and Microsoft that would create a gargantuan software base that still drives the industry today. Of all the factors that led to the success of the x86 architecture, probably none is so important as that software inventory.

THE RISC RISK

In the late 1980s and early 1990s, a serious threat to the x86 arose in the form of RISC processors such as Sun's Sparc chip, the IBM/Apple/Motorola PowerPC processor and the MIPS chip. The idea was that a processor could be made to run blindingly fast if it worked on very simple instructions, with one instruction executed each clock cycle, rather than with the elaborate, multicycle instructions used in complex instruction set computers (CISC) like the x86.

Pundits, the press and Intel competitors widely predicted the demise of CISC at the time, and Intel rushed to develop its own RISC workstation processor, the i860. But neither the 860 nor any other RISC processor came close to dislodging the hegemony of the x86.

> **"We moved from a vertical industry to a horizontal industry, and that really opened up the world.**
>
> **PATRICK GELSINGER,** EXECUTIVE VICE PRESIDENT, INTEL CORP.

Gelsinger, who was the lead architect for the 80486 processor, explains why: "The day before the 486 was announced [April 10, 1989], there was already billions of dollars of software waiting to run on the chip. Even though the [x86 CISC] architecture was a little bit slower, by the time you could develop software for the RISC machine, we could make the [x86] machine that much faster. We had an overwhelming economic advantage because we had so much of an installed base and so many people developing. The RISC machine could never catch up."

But RISC spurred much innovation, says David Patterson, a computer science professor at the University of California, Berkeley, and one of the key RISC innovators in the 1980s.

"The DEC VAX architecture, for example, could not keep up with RISC, and it more or less disappeared," he says. "But Intel was able to incorporate the ideas that were becoming popular in RISC while maintaining their old architecture with its large software base."

FLOATING-POINT FIASCO

A crisis that began in the summer of 1994, when Intel test engineers discovered a tiny flaw in the floating-point division circuitry of the new Pentium chip, was perhaps as gut-wrenching as the RISC threat. Intel fixed the flaw, but it was so minor in its impact and occurred so rarely that the company chose not to publicize it or pull the chips it affected off the market.

But a few months later, a math professor discovered the flaw in his PC. Unable to find anyone at Intel who would listen to his complaint, he posted his findings on the Internet. Before long, Intel was engulfed in a firestorm of criticism that would ultimately lead to a $475 million recall of the chip.

"It was a painful rite of passage, but we finally learned to behave like a consumer company," recalls former Intel Senior Vice President Albert Yu in his 1998 book, *Creating the Digital Future.*

MIXING AND MATCHING

Another defining moment occurred in 1995 with the introduction of the Pentium Pro, a microprocessor with some radical new features. It could look ahead in a stream of instructions, guess which ones would be needed and then execute them out of order. That kept the processor busy a larger percentage of the time, and when combined with a new, fast on-chip cache, it offered huge performance gains in some applications.

"The thing that was radically different was that they used the benefits of RISC without changing the instruction set," says Todd Mowry, a computer science professor at Carnegie Mellon University and an Intel research consultant. "They did that by translating the x86 instructions into micro-ops that are more like RISC instructions. So what you had was a RISC machine inside an x86 machine, and overnight that eliminated the performance gap."

Mowry says the Pentium Pro resulted from a top-down design process. "They started out with the design of a fast machine and then figured out how to make the x86 run on it," he says.

Adds Gelsinger, "We took the best ideas from minis and mainframes and just implemented them better, because we had a superior canvas to paint them on, called silicon."

Unlike mainframe designers, who spread processing components over a wide area inside the box, microprocessor designers put everything on a single, tiny, tightly integrated chip. This gives them more flexibility and their designs more power, he says.

Indeed, the performance of silicon chips has marched along according to Moore's Law, while systems of interconnected components have not improved as quickly.

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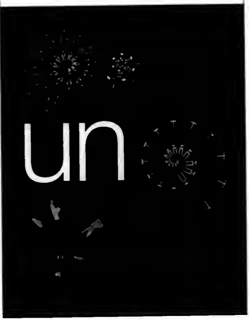

Intel has not enjoyed immunity from competition, even on its x86 home turf. For example, Taiwan-based VIA Technologies Inc. was founded in Silicon Valley in 1987 to sell core logic chip sets, some using x86 technology, for use in motherboards and other electronic components. VIA now makes a wide variety of products and aims its x86 processors at low-power mobile and embedded markets.

Advanced Micro Devices Inc., the world's No. 2 maker of microprocessors, has been a competitive thorn in Intel's side since about 2000.

Throughout most of the 1980s and 1990s, AMD had been a me-too maker of x86 chips and of hardly any concern to Intel. (It still has only about 15% of the x86-compatible desktop and mobile market, according to Mercury Research.) But AMD scored a technical and public-relations coup in 2000 with its introduction of x86-64, a 64-bit superset of the x86 instruction set. As a superset, new x86-64 machines could be used to natively run users' old 32-bit software.

At the time, Intel's 64-bit offering was Itanium, an architecture developed by Intel and Hewlett-Packard Co. for execution on big iron, and it was not directly compatible with 32-bit x86-based software. Intel responded to the AMD threat in 2004 with its own 64-bit x86 instruction superset, the EM64T. But AMD and the press made much of the fact that AMD had beaten Intel to the 64-bit market that mattered most.

"It's an example of where the flexibility of the x86 instruction set was used against Intel," says UC Berkeley's Patterson. "So even though Intel dominates the market, another company can change directions for the x86."

Today, Intel's x86 is chipping away at the extremes in computing. On April 28, the company announced that it would join forces with Cray Inc. to develop new supercomputers based on Intel x86-based processors. (Cray already uses 64-bit x86 Opteron chips from AMD.)

And on April 2, at its Developer Forum in Shanghai, Intel announced its smallest x86-based processor, the Atom. It draws less than 2.5 watts of power, compared with about 35 watts for a typical laptop processor.

So can the x86 thrive, or even survive, another 30 years? There are forces in play that will fundamentally transform microprocessor designs, even in the near term. But few are predicting the demise of the venerable x86. Says Carnegie Mellon's Mowry, "It's difficult to see any reason why another instruction set would take over, because there is so much valuable software that runs on it." ■

WHAT'S NEXT FOR x86?
See Future Watch, **page 32.**

What's Next FOR THE X86?

© FOTOLIA / JAMES BLACKLOCK

AN AMAZING RUN

Even without application-specific advances, the performance improvements from the x86's long ride on Moore's Law would have to put it among the more amazing success stories of IT.

The 8086 introduced in 1978 worked at 5 MHz and had 29,000 transistors. A 3-GHz, quad-core Intel processor for desktops today is 300 [illegible] and has 820 [illegible] transistors – about [illegible] times as many – in a [illegible] larger package and for a [illegible] cost.

– GARY ANTHES

IT'S IMPOSSIBLE to look at the x86 family of microprocessors without wondering if, after a three-decade run, the x86 might be running out of steam. Intel Corp., naturally, says it still has legs, while hastening to add that its battles with competing architectures are far from over.

Justin Rattner, Intel's chief technology officer, cites the architecture's flexibility as a key to both its past and future success. Although people often refer to the x86 instruction set as if it were some kind of immutable specification, he says, both the instruction set itself and the architecture that implements it have gone through tremendous evolution over the years.

For example, the x86 beat back an assault in the 1990s from a raft of specialized media processors with its built-in MMX and SSE instruction-set extensions, which sped up the number-crunching needed for multimedia and communications applications. Rattner also cites advancements such as hardware support for memory management and virtualization that have been added to the chip and refined over the years.

Equally important, Rattner notes, is that Intel has maintained backward compatibility across the x86 family at each step of the evolution. Advances in the instruction set plus intrafamily compatibility have enabled the x86 to span a very wide range of single-user and enterprise computers, from portables to supercomputers.

"It's important to understand that the x86 is not a frozen design," says David Patterson, a computer science professor at the University of California, Berkeley.

> **"The biggest hurdle is to go from thinking sequentially to thinking in parallel.**
>
> **TODD MOWRY,** PROFESSOR OF COMPUTER SCIENCE, CARNEGIE MELLON UNIVERSITY

"They have added about one instruction per month for 30 years. So they have something like 500 instructions in the x86 instruction set, and every generation, they add 20 to 100 more. Backward compatibility is sacrosanct, but adding new things for the future happens all the time."

A SHIFT IN STRATEGY

"There have been tremendous technical challenges in continuing to shrink the size of transistors and other things, and Intel has invested tremendously in that," says Todd Mowry, a computer science professor at Carnegie Mellon University and an Intel research consultant. One of those challenges led to what Intel calls a "right-hand turn" at the company. Heat became such a problem as circuits shrank that now performance advancements can come only from adding more processor cores to the chip, not by increasing the clock speed of the processor.

And that has shifted the quest for performance from hardware to software, says Mowry. "In the research community now, the focus is not so much on how do we build one good core as much as on how do we harness lots of cores."

One of the most promising approaches today to exploiting the parallelism in multicore chips is the use of something called "software transactional memory," Mowry says. That's a way to keep parallel threads from corrupting shared data without having to resort to locking, or blocking, access to that data. It's an algorithmic approach, but support for the technique can be built into the x86 hardware, he notes.

Mowry says the only limit to the continued addition of more cores to processor chips is the ability of software developers to put them to good use. "The biggest hurdle is to go from thinking sequentially to thinking in parallel," he says.

Rattner predicts that we'll see core counts in "the low hundreds" per chip in the next five to seven years. Since each will have multithread capabilities, the number of parallel threads of execution supported by those chips might be around 1,000, he says. But Rattner acknowledges that "there aren't too many people walking around the planet today who know how to make use of 1,000 threads."

WHAT ELSE IS COMING?

Rattner mentions some other "pretty interesting" things being developed in Intel's labs. For example, he says the x86 will include new hardware support for security — "making it more robust in the face of belligerent attacks" — but he declines to elaborate.

He also points to the coming x86-based Larrabee chip, a graphics processing unit to compete with the dedicated GPUs from Nvidia Corp. and the ATI unit of Advanced Micro Devices Inc. Larrabee will contain "an entirely new class of instructions aimed at visual computing," Rattner says.

He says that, unlike the highly specialized GPUs of its competitors, Larrabee is significant because it is an extension of the general-purpose x86 architecture.

"Here we are making a strong assertion about the robustness and durability of the architecture: that we can take it into domains that most people felt were beyond its capabilities," he says.

AMD has a similar plan. In January, the company said it would introduce a hybrid CPU-GPU chip called Fusion as an extension of its existing Phenom line of processors. It will ship in 2009 first as a two-core unit for notebook computers, AMD said.

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VIA Technologies Inc., which just announced its VIA Nano Processors (formerly Isaiah) for the mini-notebook market, says it will continue to target the mobile market with its power-efficient line of x86 processors but will also edge toward the desktop market.

"There is an inherent limit for the x86 at the low end, for something like your toaster or the fuel injector in your car," says Glenn Henry, president of the Centaur unit of VIA. "And there probably is a limit at the very high end if you are going to do something like simulate atomic bombs. In between, the x86 has proven over and over that it can adapt."

Might some brand-new microprocessor architecture come along and blow the x86 out of the water? Rattner says Intel is still partly protected by that Wintel software inventory.

"Unless you can come in and say that if you use this different instruction set, you'll get five times better performance, there just isn't a big enough incentive to switch," he says.

But that's not to say the x86 instruction set won't be implemented in new ways as silicon transistors increasingly bump up against the laws of physics. For 40 years, transistors have been under the surface of the silicon wafer. Now technology is emerging to allow them to be placed on top of that surface.

That would make it possible to build the transistors out of materials other than silicon — materials like gallium arsenide that have better energy and performance characteristics. "We won't be at the surface for another generation or two," Rattner says (each generation is about two years). "But the decade ahead will see a lot of innovation in materials."

Although Intel is working to develop new transistor-based electronics, Rattner says the company is "not more than dabbling" in more far-out possibilities such as processors for quantum and DNA computing. "Those really change the mathematical foundation of computing and are much more risky," he explains. Moreover, he says, they are likely to be restricted to narrow application domains, not to general-purpose computing.

Mowry predicts that a move to those esoteric technologies is 20 years out. "My guess is it won't be until we really start reaching the end of what we can do with conventional technologies that people will get serious about these things," he says. "When you are trying to build wires out of single strands of atoms, things get very strange and you don't know what to do exactly." ■

[illegible] ...

HAPPY BIRTHDAY, x86
Read about 30 years of x86 in our cover story, **page 28**

Why Women Quit Technology

More than half of the women in science, engineering and IT leave the field at midcareer. Here's the reason.

What if half the men in science, engineering and technology roles dropped out at midcareer? That would surely be perceived as a national crisis. Yet more than half the women in those fields leave — most of them during their mid- to late 30s. In this month's Harvard Business Review, **Sylvia Ann Hewlett**, *Carolyn Buck Luce and Lisa J. Servon describe the Athena Factor, their research project examining the career trajectories of such women. Hewlett, founding president of the Center for Work-Life Policy in New York, told Kathleen Melymuka about what they learned.*

Your research shows that there are more women on the lower rungs of science and technology fields than most people suspect. Women are actually excelling in science, engineering and technology, despite the fact that the schools are not very good at encouraging them. Many don't just survive the educational process but get some distance in terms of careers. The story is very encouraging in the early run. Between ages 25 and 30, 41% of the young talent with credentials in those subject matters are female. It's a more robust figure than many suspect. That's the good news.

What happens later? The bad news is that a short way down the road, 52% of this talent drops out. We are finding that attrition rates among women spike between 35 and 40 — what we call the fight-or-flight moment. Women vote with their feet; they get out of these sectors. Not only are they leaving technology and science companies, many are leaving the field altogether.

How many women are we talking about? We reckon that maybe a million well-qualified women are dropping out in that age range. We reckon that if you could bring the attrition rate down by 25%, you would hang on to about a quarter of a million women with real experience and credentials in these fields — fields that are suffering a labor shortage.

Based on the demographics, it seems likely that they leave to start families. Is that what happens? No. I'm not trying to pretend that work-life balance is not important, but we found four other more important factors about the culture and the nature of the career path. We call them

The Good News

SEVERAL of the companies that were involved in the Athena Factor project are experimenting with programs to change the pattern of the female exodus from IT. Here are some of the more promising initiatives:

Cisco Systems Inc. launched the Executive Talent Insertion Program for lateral recruiting of senior women and multicultural talent. As of mid-May, 15 new female vice presidents had been recruited, including Chief Technology Officer Padmasree Warrior.

Intel Corp. has created a women's engineering forum. The goal is to showcase their research, relieve isolation, foster solidarity and mentoring, and support creativity.

Johnson & Johnson has a program called Crossing the Finish Line, which provides high-potential women with career development resources and, more important, senior sponsors who are charged with looking out for them.

General Electric Co. is initiating a program called Restart in its Bangalore global research center. The goal is to reach out to women who have left to rear young children and to facilitate their return when their children reach school age.

– KATHLEEN MELYMUKA

"antigens," because they repel women.

Tell me about those. The most important antigen is the machismo that continues to permeate these work environments. We found that 63% of women in science, engineering and technology have experienced sexual harassment. That's a really high figure. They talk about demeaning and condescending attitudes, lots of off-color jokes, sexual innuendo, arrogance; colleagues, particularly in the tech culture, who genuinely think women don't have what it takes — who see them as genetically inferior. It's hard to take as a steady stream. It's predatory and demeaning. It's distressing to find this kind of data in 2008.

Is this data global or national? We studied private-sector employers in the U.S., and then we looked at three large, global companies with women working across the world. We also did a bunch of focus groups in Australia, Shanghai and Moscow. The data were pretty consistent. Actually, India is a little better than the U.S. But there's not much variation across geography.

What are the other antigens? The second one was the sheer isolation many women cope with daily. She might be the only woman on the team or the only senior woman at a facility. Isolation in and of itself is debilitating, with no mentors, no role models, no buddies. And if you're surrounded by men who don't appreciate you, that can be corrosive.

The third thing is that, for many women, the career path is all very mysterious because they don't have mentors or sponsors or folks looking out for them. Some of them can't begin to map what the career ladder looks like. This mystery adds to the sense of stalling, of being stuck and not knowing where to go or how to get there.

The fourth thing is the risky behavior patterns that are rewarded. We found, particularly in the tech firms, that the way to get promoted is to do a diving catch: Some system is crashing in Bulgaria, so you get on the plane in the middle of the night and dash off and spend the weekend wrestling with routers and come back a hero, and there's a ticker-tape parade, and you get two promotions — you can actually leap a whole grade if you rescue a big enough system.

But what does that have to do with gender? Women have a hard time taking on those assignments because you can dive and fail to catch. If a man fails, his buddies dust him off and say, "It's not your fault; try again next time." A women fails and is never seen again. A woman cannot survive a failure. So they become risk-averse in a culture where risk is rewarded. Women would rather build a system that didn't crash in the first place, but men enjoy that diving catch and have a system of support that allows them to go out on a limb.

So finally we come to work-life? The fifth one is a combination of extremely long hours — in tech, the average workweek is 71 hours — emergencies and a very family-unfriendly atmosphere. And at 35 to 40, women are often having the second kid, a time when even the most organized woman finds herself caught short by the demands of her life.

Is this whole scenario worse in technology and science than in other types of jobs? We did work in other fields in our '95 study. It was a slightly different pool, but we found that women across industries will often take a brief break — like for two years. But our sense is that this is distinctly worse. In many fields, almost 100% of women will try to get back into the industry [later]. Here, only 60% say they would be willing to give it another try if conditions were right.

So 40% leave the industry entirely. Right. They've been too badly burned. It's particularly serious for the women who have invested decades getting a Ph.D. in a much-loved field — and for society.

What practical steps should CIOs take to keep women from leaving? It's the most standard solution in the world: You've just got to get mentors to pair with the young talent.

It is a total savior, because it prevents the isolation setting in, allows them to start mapping their career paths and insulates them from some of the worst repercussions of the macho behaviors. If you have only a few senior women, use some of your men.

And use technology. Cisco is using telepresence technology to do virtual mentoring sessions across the world — linking young women in India with senior women in San Jose. ■

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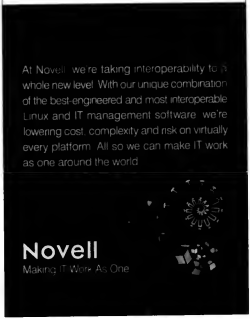

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Discovering Tricks Of E-discovery

Federal rules governing **retention** of electronic documents **pull info security** into the **legal domain.**

IT'S NOT often that I'm contacted by my company's legal counsel, but when he sent me a meeting request with the topic of "data retention," I realized that this could mean only one thing: e-discovery. Whatever size organization they work for, security managers must be prepared to address this subject.

The Federal Rules of Criminal Procedure are definitely within the purview of legal counsel. E-discovery, though, is where the FRCP intersect with IT and information security. The FRCP require companies to preserve data, be it on paper or some electronic medium, that might be related to litigation, whether it's pending or merely anticipated.

Discovery, of course, is part of the process in all lawsuits. It involves lawyers for one side requesting information that the other party has access to. The FRCP bring this process into the 21st century, extending discovery to electronic media.

As I understand it, e-discovery is generally pretty straightforward. If a company is being sued for, say, sexual harassment, it would first have to disclose to opposing counsel the types of information it has available: paper memos, e-mail or instant messages from the period in question. What is available depends on the company's retention policy. If the policy is to keep e-mail for one year, then it isn't obligated to provide e-mail interactions relevant to the lawsuit that were sent two years ago.

Where things get interesting is when you're talking about "anticipated" lawsuits. According to some interpretations of the FRCP, if an employee tells a manager that he is "thinking about" filing a lawsuit against the company, the company must begin at that point to retain all data and communications that the employee is party to.

■ Things get interesting when you're talking about 'anticipated' lawsuits.

All this was reviewed as I sat in a conference room filled with lawyers. Of course, the lawyers didn't say any of it quite so simply; in fact, I had a bit of a hard time staying awake while the legal jargon droned on. In the end, though, I was able to make some sense of my responsibility.

First, I am going to inventory all of our data repositories and capabilities. What do I mean by "capabilities"? I'll explain with instant messaging as an example. We use Microsoft Office Communicator for IM. By default, we don't retain any IM communications — the disk-space requirements for 8,000 employees are prohibitive. However, we have the capability of recording IM traffic and could initiate it at any time if we anticipated a lawsuit. The same can be said for technologies such as intrusion detection, data leak prevention and content filtering.

Trouble Ticket

ISSUE: Federal rules make the legal discovery process an IT issue.

ACTION PLAN: Inventory all electronic depositories, and be prepared.

When my inventory is done, I will assign custodians for each repository and capability. They will be the contacts for their particular repositories if an e-discovery request is made. We're also going to have to set some data-retention policies for each repository.

Finally, we'll want to evaluate various technologies to assist with data discovery. The decision on that will come down to cost.

When an e-discovery request is made, we become responsible for finding the relevant data, be it in databases, file shares, mail archives, IM logs or some other place. If we did the search for the data manually, we would have to pay hundreds of dollars per hour. But there is no shortage of technologies that are designed for just this type of activity. We'll want to find a technology that integrates with as many of our data repositories as possible, has an easy-to-use interface and makes it even easier to provide the information to the interested parties.

JOIN IN
To join in the discussions about security, go to **computerworld.com/blogs/security**

I'm sure we'll find what we need. But I hope we'll never need it. ■

This week's journal is written by a real security manager, **"Mathias Thurman,"** *whose name and employer have been disguised for obvious reasons. Contact him at mathias_thurman@yahoo.com.*

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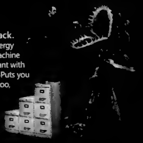
1. Know your leafy enemy.
What changed your dusty, dried-out office plant into a bloodthirsty menace? Will you be held responsible for the workloads of your devoured coworkers?

2. Office coffee.
This works well against so many office threats. The more over-brewed, reheated, and dirty-pot-prepared, the better. Two pots and it's over.



3. The junk food attack.
In the afternoon, when energy is low, raid the vending machine and fill the Man-Eating Plant with snacks, chips, cookies, etc. Puts you right to sleep—the Plant too, we bet.

4. Go green.
We mean literally. Disguise yourself as a plant—a leafy fern, perhaps—to escape carnivorous Plant scrutiny. Helps you escape boss scrutiny as well.

5. Weed spray.
This is generally nasty stuff, but there are plenty of organic weed sprays on the market. And this is a Man-Eating Plant, so it seems justified.

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Processing That Packs a Punch

Northrop Grumman's SuperCluster is 20 times faster than its predecessors.

By Jennifer McAdams

BEST IN CLASS This story is part of an ongoing series showcasing the best projects of this year's Premier 100 IT Leaders.

Northrop Grumman Space Technology Sector
This $3.1 billion unit of Los Angeles-based Northrop Grumman Corp. develops electronics for military and space systems.

IT CHAMPION: Brad Furukawa, vice president and CIO

IT STAFF: 550 people

IT BUDGET: $150 million

PROJECT PAYBACK:
Increased processing time by a factor of 20; integrated 400 complex engineering applications into a single infrastructure; retired more than 300 Unix workstations; improved overall efficiency and reliability of engineering design.

TO GET a feel for the massive processing power Northrop Grumman garnered through its recent high-performance computing initiative, consider the fact that it would take a single workstation nearly three years to process the amount of data that the new "SuperCluster" can now churn through in half a day.

The aerospace giant needs sky-high processing power so that scientists and engineers working on spacecraft design and other projects can perform complex computations on the massive amounts of data pulled from an array of satellites orbiting the planet.

For instance, a single climate-sensing satellite might carry 45,000 sensor elements — each extracting thousands of images. Northrop Grumman engineers must use all that data in complex modeling, simulation and analysis exercises.

To meet the processing demands of its engineering and scientific community, Northrop Grumman's IT staff installed a cluster of 1,800 Linux-based CPUs that are capable of performing parallel processing. The new SuperCluster high-performance computing system is 20 times faster than previous systems.

By year's end, it will have 6,000 CPUs.

"Prior to the availability of our SuperCluster, individual departments and programs had developed high-end computational solutions, such as Beowulf clustering, turnkey multiprocessors and compute farms," explains Brad Furukawa, vice president and CIO of Northrop Grumman's Space Technology Sector in Redondo Beach, Calif. "Maintaining these small stand-alone clusters proved to be highly inefficient."

Improving efficiency took more than additional CPUs, he says, emphasizing the need for better load balancing and increased storage capacity, which is now 20TB collectively.

"Our high-performance-computing SuperCluster is more than just a large number of processors," says Furukawa. "Given the configuration of job types in use, the local storage is a critical part of serving large amounts of data to the many processors working simultaneously."

"Our high-performance-computing SuperCluster is more than just a large number of processors.

BRAD FURUKAWA, VICE PRESIDENT AND CIO

Northrop Grumman's move away from scattered computational resources reflects a trend among organizations that need massive processing power.

"Many of our clients are building similar computing resources, where previously they had many independent islands of computing in the form of stand-alone clusters or scale-up systems," says Carl Claunch, an analyst at Gartner Inc.

IT executives interested in centralizing a great deal of processing power must look beyond buying high-end boxes.

"We learned that having the SuperCluster hardware in place was only the first step," says Furukawa. "We also invested in having properly trained and skilled IT staff in place to support the environment, and we purchased software that would let us manage and prioritize the massive number of jobs we have."

As with any major corporation, having sound methods for establishing priorities is crucial for Northrop Grumman, which must not only strive to achieve the best in spacecraft design, but also work to satisfy high-profile customers.

"We have been able to perform far more comprehensive analysis of our designs and identify potential anomalies earlier in the process," Furukawa says. "We were also able to curtail the practice of 'overdesign' with more precise modeling and analysis capabilities." ■

McAdams *is a freelance writer in Vienna, Va. Contact her at JMTechWriter@aol.com.*

■ **OPINION**

Paul Glen

The Project's Over: Now What?

I'VE OFTEN heard people complain about intense projects: They're too much work and emotionally draining. But oddly, I've noticed that people seem to have more trouble *after* an intense project than during one.

I think that there are three basic types of projects in IT. There are deployment projects, during which we disseminate a new technology either directly to the users or to the bowels of the infrastructure. Then there are maintenance projects, in which we refine some already deployed technologies. One may be adding features or functions to a software package; another may be upgrading the software embedded in last year's routers. And, finally, there are the creation projects, during which we define and develop something entirely new.

Although all projects require intense commitment and creative problem-solving, there's something special about creation projects. When they go well, the team bonds with more intensity than other teams do. I think this is because, to be truly creative, people need to be willing to be more vulnerable — to share their best ideas even at the risk of being ridiculed should the ideas turn out to be bad. For the collective to be at its most creative, everyone has to be willing to be exposed.

As a result, people who share this mutual vulnerability and successfully navigate these dangerous emotional waters seem to connect to one another in deeper and more lasting ways than those on teams doing other sorts of projects.

This is why, when we reflect back on our careers, we find that certain projects, regardless of their actual size, seem larger and more important than others. Even though they may have lasted a relatively short period of time, they seem to occupy more mental space than other, perhaps larger projects do. These projects represent peak experiences in our work life. The intensity with which they shine through the years is directly related to the emotional connections that we forged with our teammates.

■ **At the end of peak experiences comes the inevitable letdown.**

At the end of peak experiences comes the inevitable letdown. Usually a group has been pushing hard for months on end, living and breathing nothing but the project, spending more time with their colleagues than with their families. And then, suddenly, it's over. The system is released. The pressure is gone. But the adrenaline remains.

How managers handle this letdown determines whether employees move on to other things and become productive in new roles or consider looking for new places to work.

Why would people want to quit after having one of the best professional experiences of their lives? Because they look out to the future and see that it doesn't hold the promise of the same excitement and engagement that they've just experienced. So they move on, trying to reproduce a unique event.

Of course, they're never able to do it, but it doesn't stop them from trying.

Managers need to treat the transition from an intensely creative project with great care in order to retain the hearts and minds as well as the bodies of their most valuable employees.

People need time to decompress. But, more important, they need something to look forward to. Just knowing that work will not be as brutally intense as it was in the past isn't enough. Appreciation for their efforts isn't enough, either. Even more money isn't enough.

What employees who have been excited by their immersion in a creative project need most is to see a future with a new opportunity to do creative work and a new group of colleagues to be creative with. The best antidote to withdrawal from engagement is the promise of future engagement. ■

Paul Glen *is the founder of the GeekLeaders.com Web community and author of the award-winning book* Leading Geeks: How to Manage and Lead People Who Deliver Technology *(Jossey-Bass, 2003). Contact him at info@paulglen.com.*

Career Watch

[illegible] LIPS [illegible]

89% [illegible] executives and [illegible] a recent survey who [illegible] verbal communications from their [illegible] are effective. In fact, 31% of the 192 r[illegible] communications are "ur-trem[illegible]." And it's working in both directions: 78% [illegible] verbal communications from their superiors are effective.

SOURCE: NFI RESEARCH, MADBURY, N.H., APRIL 2008

Info Security Job Security

We've all heard the stories about how desperate companies are to hire competent information security professionals. A survey sponsored by the Computing Technology Industry Association in late 2007 confirms that anecdotal evidence. Of the more than 3,500 IT managers worldwide who participated, the majority said that security is the technology skill that's most important to their organizations. But they also said there is a significant shortfall of available skills. Among IT managers in nine countries with established IT industries (a group that includes the U.S.), **73% cited security, firewalls and data privacy** as the IT skills most important to their organizations today. But only **57% said their IT employees are proficient in those skills.**

What are they doing about the skills gap?

59% plan to have their tech workers pursue additional professional training.

43% are encouraging their workers to obtain professional industry certifications.

42% intend to implement career planning or mentoring programs to enhance skills.

41% will reward employees who boost their skills on their own with incentives and recognition.

They also plan to boost security spending.

In a 2007 CompTIA survey of more than 1,000 organizations, **nearly one-half** of the respondents said they planned to increase spending on **security-related technologies**, and another **one-third** said they expected to increase spending on **security training.**

PAGE COMPILED BY JAMIE ECKLE

ASK A PREMIER 100 IT LEADER

Vidya S. Byanna

The **executive director** of global infrastructure at **Accenture LLC** answers questions about **career longevity**, moving into project management and **finding a mentor**.

I've been a programmer for 12 years, and I'm beginning to feel that it's an occupation headed for extinction in the U.S. How can I best ensure a long and happy career in my chosen field? While there is a significant trend to leverage resources from outside of the U.S. for IT skills, you can ensure a long and happy career by developing deep specialization in a specific technology area. For example, there is likely to be demand for people with deep skills in ERP platforms such as SAP and Oracle or in programming languages like .Net, J2EE or C++.

Everyone says project management is a key skill in IT. If I have no project management experience, how do I begin to pick up some basic skills? (I don't want to ask for formal training until I have a foot in the PM door.) I don't know your specific situation or role, but I have a couple of suggestions. First, if you are able to participate in project status meetings at your company, that is a good way to learn more about projects and how they are managed with respect to resources, budget, timelines and potential problems. I also recommend that you visit the Web site of the Project Management Institute. There is a section of the Web site dedicated to resources that includes a virtual library of information, research and publications.

My company doesn't have a formal mentoring program. How do I go about finding the right person to help guide me as I build my career in IT? The best thing to look for is someone you respect and whom you would like to emulate. Ideally, he or she will have a broad range of experience and good listening skills and, most important, will help you better understand your goals and aspirations. Don't limit your search to someone at your company. A friend or someone from the industry is equally good. Finally, don't be shy about asking people. In my experience, most IT managers and leaders are happy to help others in the industry develop their careers. Good luck!

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IT careers

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Minimum Requirements Bachelor's Degree in Information Systems or Computer Science, or foreign equivalent, plus 5 years of experience in a related field In the alternative, employer will accept a Master's Degree in Information Systems or Computer Science plus 2 years of experience in a related field Of the required experience, at least 2 years must be with JD Edwards Software/ ERP implementation, architecture and/or development All Candidates must have legal authority to permanently work in the US Applicants meeting all requirements, please apply online at http://rfpcojobsa iapplicants.com

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SharkTank

TRUE TALES OF IT LIFE AS TOLD TO SHARKY

Essential, Defined

Small engineering company has a T1 Internet connection that works fine almost all the time. "For the 'almost' part, I set it up so that I can share an aircard connection until the T1 is restored," says a sysadmin pilot fish on the scene. "Bandwidth is limited, so I told everyone only to use essential Internet services – no large e-mail attachments and only limited Web research – until the T1 was restored. But response times were much slower than they should have been. Going around to check on individual users, I found one who was streaming sports video. I asked him why. He said it was essential to keep up with his favorite team."

Secret Weapon

It's the early days of home computers, and this utility company gets a fresh request to supply data to a government office. A pilot fish goes to the new $20 million mainframe to create the report, but "after a lot of messing around, I realized the query could not be written to extract the data in the format they requested," fish reports. "Rather than miss the deadline, I took it home and ran it on my computer – 48K memory running BASIC. I brought the output back in, fed it into a file on the mainframe and printed it out. Our figures were checked and confirmed by the government office. All the other companies failed to deliver the information, and afterward we were phoned by every one of them asking how we did it. We never told them."

Whatever It Takes

This company is setting up special communications channels with several customers, and things go well for most – but not for everyone. "We had a customer that was seeing intermittent connection problems," says a pilot fish there. "This went on for months – our developers and QA folks were unable to duplicate the scenario. Then a tornado hit the client's building last week, and they had to move completely to another site. Everyone was OK – and the problems disappeared. Usually, 'act of God' goes under 'Problem,' not 'Resolution.' "

How to Make Time

Programmer pilot fish is responsible for this trucking company's payroll system. "I was tasked with a major update to the system, focused on how the union members were paid," says fish. "My manager asked for an estimate of when I could have it done, which I gave him. He then added time to it and sent it up the chain to his manager. This manager also added time to the project. I completed the project and installed the extensive updates on time. Matter of fact, I completed the upgrade sooner than my original estimate."

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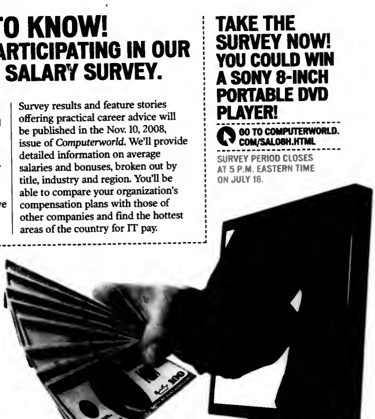

■ FRANKLY SPEAKING

Frank Hayes

iPhone? Why Not?

IT'S STILL not good enough. That's the reaction of IT analysts and security outfits to Apple's new iPhone 3G. Sure, the iPhone 2.0 software will support Microsoft Exchange and Cisco VPNs. But is it safe enough for enterprise use — as safe as, say, PCs? Gartner says not quite. The security guys say be afraid. It's just not good enough yet.

And it never will be. Oops, that wasn't supposed to slip out.

But hasn't that historically been IT's official position? We're the Department of No. Whatever it is, we're against it.

Cell phones? Wi-Fi? BlackBerries? Web sites? LANs? Laptops? Spreadsheets? PCs? Departmental minis? Not one of those technologies was secure enough, reliable enough and enterprise-ready enough when business users first insisted on sneaking them in under the IT (or MIS or DP) department's radar.

Of course, users had to sneak that stuff in. They knew what the answer would be if they asked us: No. Not ready. Not good enough. Not yet.

And if it was up to us, not ever.

Somehow, though, in the end those users got their way. We made our peace with those unfamiliar, much-dreaded technologies. We figured out how to lock them down, cordon them off or keep them under control.

Thus, today we hear analysts and security vendors advising us to avoid the much-dreaded iPhone because it may not be as secure as the (once much-dreaded, now familiar) PC.

Ironic? Sure, but we all know the fear that drives that irony. Security and reliability *are* important, and we already have enough trouble on both those fronts. PCs are the devil we know. We're stuck with them. And we can still nurse the fantasy that we can keep iPhones out by just saying no.

But why? Why turn users into outlaws again? It never works. It just reinforces the idea that we're the Department of No.

■ Why turn users into outlaws again? It never works. It just reinforces the idea that we're the Department of No.

Besides, aren't we a lot better off demonstrating that we're the Department of Know-how?

When users come to us with the new iPhone — and now that its price has dropped from the stratosphere to $199, a *lot* of users will be coming to us — we don't have to tell them they can't connect to our systems.

Instead, we can start out by asking them what they want to do.

They might ask for the moon. Or they might have more modest ambitions, nothing that would test our systems' security or reliability at all.

Once we know exactly what they want, we can evaluate what will be required and lay that out for the users.

Some of the requirements will be technical. That's our job, and we'd better be up to it. Another part may be budgetary — someone always has to pay the bill.

Yet another requirement is patience and involvement on the part of those users. To ensure that the result is reliable and secure, we'll have to take a one-step-at-a-time approach. That means users will have to tell us what they want first, and what's less important. They'll have to cut their wish lists and do some waiting. They'll have to prioritize, make decisions and accept compromises — just like we do with every IT project.

Put simply, they'll have to become active partners in the iPhone implementation project.

That won't be a completely satisfactory process for users champing at the bit to get their new iPhones running all over our systems. It won't be quick enough, or let them experiment as much as they want.

But it'll sure beat a blanket denial from the Department of No.

And what do you bet that — like the iPhone — it'll turn out to be good enough? ■

Frank Hayes *is* Computerworld's *senior news columnist. Contact him at frank_hayes@ computerworld.com.*

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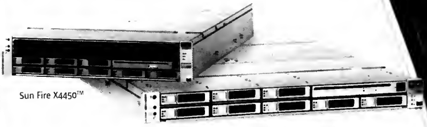

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